IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. :

U.S. National Serial No. :

Filed :

PCT International Application No. : PCT/EP2004/012041

VERIFICATION OF A TRANSLATION

I, Susan ANTHONY BA, ACIS,

Director of RWS Group Ltd, of Europa House, Marsham Way, Gerrards Cross, Buckinghamshire, England declare:

That the translator responsible for the attached translation is knowledgeable in the German language in which the below identified international application was filed, and that, to the best of RWS Group Ltd knowledge and belief, the English translation of the international application No. PCT/EP2004/012041 is a true and complete translation of the above identified international application as filed.

I hereby declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application issued thereon.

Date: May 19, 2006

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For and on behalf of RWS Group Ltd

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Arrangement and method for using a cellular phone in an aircraft

The invention relates to an arrangement and to a method for connecting a cellular phone located in an aircraft, land vehicle, sea- or spacecraft to a stationary mobile radio network.

At present, it is not possible to use cellular phones in aircraft. On the one hand, interaction with the electronic on-board systems is feared and on the other hand, no mobile radio networks where a cellular phone could log in are available especially in the case of long-distance flights over unpopulated regions or water.

At present, the aircraft of many airlines are equipped with proprietary communication systems which allow the passengers to conduct voice and/or data communication during the flight. As a rule, these systems are expensive to procure since all seats (or at least rows of seats) must be equipped with corresponding terminals. The connecting costs are also high.

The invention is based on the object of creating an arrangement and a method of the type initially mentioned which provide for simple communication of passengers of a vehicle with external persons, computers or the like.

This object is achieved by the invention by means of an arrangement which exhibits the following:

- on board a vehicle:

a) at least one mobile radio base station,

b) a device for converting the mobile radio data into the IP protocol and conversely,

c) a device for transmitting/receiving IP data to/from a ground station,

- at a stationary position:

d) a device for transmitting/receiving IP data to/from a corresponding device of the vehicle,

e) a device for converting the IP data into mobile radio data and conversely,

f) a device for transmitting/receiving the mobile radio data to/from the stationary mobile radio network.

The method according to the invention has the following steps:

aa) logging-in of the cellular phone at a local mobile radio cell which is formed by a mobile radio base station arranged on board the vehicle;

bb) converting the mobile radio data into the IP protocol and conversely;

cc) transmitting/receiving the IP data to/from a ground station;

ee) converting the IP data into mobile radio data and conversely;

ff) transmitting/receiving the mobile radio data to/from the stationary mobile radio network.

Firstly, some terms used in the invention will be explained. The invention can be used for vehicles of all types. In particular, it can be used in air- or sea craft which also stay out of range of stationary mobile radio networks. It can also be used for land vehicles such as, for example, railroad vehicles which travel through regions that are sparsely populated and therefore poorly covered by the mobile radio networks, and/or in which problems occur due to Faraday shielding of the interior of the vehicle. Spacecraft are vehicles which move outside the earth's atmosphere.

Stationary mobile radio networks are the usual land-based mobile radio networks in which a large number of stationary base stations forms mobile radio cells. They can be GSM, UMTS or mobile radio networks according to other conventional standards. They are preferably digital mobile radio networks in which the mobile radio data are transmitted in digital form.

According to the invention, one (or possibly more) mobile radio base stations are arranged in the vehicle. This forms a local mobile radio cell in the interior of the vehicle where cellular phones of the vehicle passengers can log in. The capacity of the base station, i.e. the number of cellular phones which can be logged in at a maximum is adapted to the expected number of vehicle passengers telephoning or transmitting data at the same time. Since the mobile radio base station with its associated antenna is arranged in the immediate vicinity of the passengers and their cellular phones, for example in aircraft, the cellular phones can transmit with very low power so that interaction with the remaining on-board electronics is minimized. If necessary, the remaining on-board electronics can be additionally shielded.

According to the invention, the mobile radio data received by the base station are converted into the IP protocol. The IP protocol is the data protocol of the Internet known to the expert.

These IP data are then transmitted to a ground station by a corresponding device. It can be a connection to a ground station which is switched via, for example, satellites. A particular advantage lies in the fact that radio connections for transmitting IP data already exist in vehicles or are being installed, respectively. These IP connections are used, on the one hand, for the communication of the on-board systems with, for example, monitoring devices on the ground and, on the other hand, provide on-board Internet access to the passengers of an aircraft. A corresponding system for establishing an IP connection between aircraft and ground is offered, for example, by the Boeing company under the name Connexion.

The invention can therefore utilize this IP data connection, which exists in any case or is to be installed for other reasons, between aircraft and ground station for also inexpensively transmitting mobile radio data in the IP format.

In a ground station, the IP data are converted again into mobile radio data (for example GSM or UMTS data). To "filter" the corresponding data out of all the IP data, IP call managers known in the prior art and to the expert can be used which are already being used for Internet IP telephony.

The reconverted mobile radio data are then fed into the stationary mobile radio network by a corresponding device of the ground station. For this purpose, there can be either a line connection with the operator of the mobile radio network or corresponding mobile radio

stations can also simply be used which, as it were, simulate the cellular phone located in the vehicle for the mobile radio network. Corresponding so-called mobile radio gateways are commercially available. For the GSM network, there are GSM gateways which can establish connections with local stationary mobile radio networks on a selectable number of channels.

The invention allows the passenger in a vehicle to telephone on board in such a manner as if he were located on the ground in the area of the corresponding mobile radio network. He only incurs the mobile radio connecting costs which would also arise on the ground. If the ground station is arranged in the land region of the home network of the vehicle passenger, he can telephone at the low costs incurred with such a telephone call in the home network. In addition, there can be costs for the IP connection which, as a rule, are charged by the airlines as single flat-rate charge for the use of the IP connection, independently of the purpose for which this is done (mobile telephony, use of the Internet access provided on board or the like). According to the invention, a number of ground stations can be provided in the area of the mobile radio networks of various countries. Since, as a rule, passengers from different countries are on board an aircraft, every passenger can thus log in at his home network or the most cost-effective mobile radio network in each case via a corresponding gateway and the connection according to the invention.

The transmitting/receiving station on the ground for the IP data, on the one hand, and the devices for converting the IP data into mobile radio data and mobile radio gateways, on the other hand, can be spatially separated from one another and connected to one another, for example, via the Internet. A single transmitting/receiving station on the ground for IP data can therefore also be connected to spatially

separated devices, located, for example, in the area of different stationary mobile radio networks, for converting into mobile radio data and mobile radio gateways.

In the vehicle, a mobile radio pico cell is preferably formed. This is a very small cell and the base station accordingly only requires very low transmitting power. If necessary, a number of mobile radio pico cells can be formed in larger vehicles, for example large aircraft or ships.

The connection between the on-board mobile radio base station and the on-board transmitting/receiving station for IP data can be established via the intranet of the vehicle. Since, as a rule, an intranet and an IP data transmitting/receiving station exist or are being retrofitted in any case in aircraft, retrofitting the system according to the invention on board thus only requires the mobile radio base station and the device for converting the mobile radio data into the IP protocol and conversely.

In the text which follows, the invention will be explained with reference to the drawing which shows an arrangement according to the invention diagrammatically.

On board an aircraft, a GSM base station 1 is arranged which forms a GSM pico cell. The base station 1 is connected via the on-board intranet to a GSM/IP converter 2 which converts the GSM data into IP data and conversely. An IP call manager 3 feeds the IP telephony data into the intranet or ethernet of the aircraft and takes the corresponding received IP telephony data from the network, respectively. The connection to a ground station is established via a satellite via an on-board antenna indicated at 4. The transmitting/receiving station on the ground is

connected via the Internet to an IP call manager 5 which, as it were, filters the corresponding IP data out of the Internet and converts them back into GSM data via an IP/GSM converter 6. The IP/GSM converter 6 is connected to GSM gateways 7 which establish the connection to the stationary mobile radio network 8. The sequence described is correspondingly reversed for GSM data which are sent from the stationary mobile radio network 8 to a cellular phone in the aircraft.